

Self-Prompted Transmissive Frequency Switching via Spheroid Thermally-Actuated Reciprocal Charge Conveyors

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Sophisticated RADAR systems rely upon the ability to rapidly switch operational frequencies both for the purposes of preventing jamming and for maximizing the range and resolution of the RADAR system. Disparate materials have greater RADAR reflectivity at specific frequencies which must be determined in real-time. An aircraft which is low-observable at most frequencies may be more observable at extremely bespoke frequencies or combinations of frequencies which must be determined through a trial-and-error process. Sophisticated RADARs, once they have determined the optimal tracking frequencies for a particular object it is tracking, will continue to use those optimal frequencies once they can be determined, meaning that the maximum range of such a RADAR system after an object has been thoroughly analyzed is greater than the maximum range at the time of initial detection. A stealthy aircraft we fail to see until it is only 50 miles away, for example, once interrogated by the RADAR system thoroughly, can be tracked upon egress from the area at ranges of up to 82 miles and the optimized frequency settings can be relayed to other aircraft for subsequent re-acquisition. If the same aircraft is used in a sortie a day, week, or month later, it can quickly be re-acquired at the 82 mile range because the system “remembers” it and tries those frequency settings first, much as password cracking software attempts dictionary-based attacks before resorting to bruteforcing.

Understanding that this is the underlying logic of these sorts of detection regimes, one can begin to improve upon them so that we could, perhaps, extend the range of detection to 90 or 95 miles for low observables.

The mechanisms traditionally used to achieve this rapid frequency switching result in the generation of enormous amounts of heat, as do RADAR systems, generally. The number of frequencies at which a RADAR system can operate are ultimately determined by the number of individual antenna in a phased array.

Therefore, it would be useful to have a mechanism which would enable frequencies just above and just below the design frequency of each of the antenna in the array to be tried without further taxing the underlying systems which enable these RADAR systems. This would have the effect of filling in the gaps and allowing every possible frequency within the relevant band to be tried.

This author proposes that hollow spheroids composed of tantalum be positioned forward of each of the antenna in a phased-array RADAR system. A heating wire would be used to heat the side of that spheroid closest to the antenna so that the charge capacity of that region of the spheroid would be enhanced, as would its tendency to expel electricity after current is suspended. A heating wire would be run to a point on the at a “pole” on that

sphere closest to the antenna and an electrode would be run to the point antipodean to the heated pole.

When a circuit is opened to this hollow spheroid-shaped capacitor, current flows into the capacitor and flows to a greater degree toward the heated area, with the thermal gradient serving to shape the directionality of electron flow through this specialized capacitor. A chilling apparatus may be required to be applied to the side featuring the electrode in order to ensure a definitive and consistent gradient.

When the circuit is closed and current is suspended, the overcharged area would naturally return some of the electrons in that part of the spheroid toward the other areas of the sphere and in a direction which is consistently away from the heated area.

Electromagnetism in the high-microwave band would be stepped up in its frequency as a consequence of encountering a "head-wind" of current and would be stepped down as a result of a "tail-wind."

Although the effect would be modest, it would fill in the gaps between the operational frequencies of each of the component antennae. The extent of the adjustment to the base frequency could be fine-tuned by applying varying amounts of current to the spheroid capacitors, which may be termed Spheroid Thermally-Actuated Reciprocal Charge Conveyors (STARCC.)